PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-142132
(43)Date of publication of application : 17.05.2002

(51)Int.CI. H04N 5/20
G09G 5/00
G09G 5/06
G09G 5/10

(21)Application number : 2000-332237
(22)Date of filing : 31.10.2000

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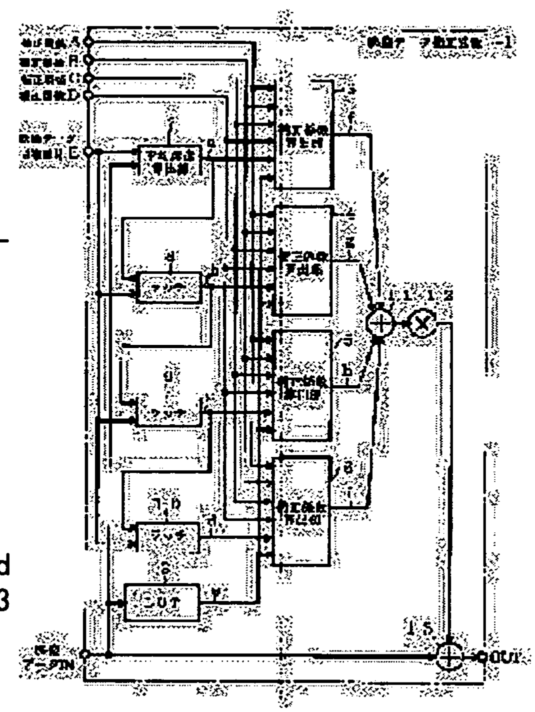
(54) APPARATUS AND METHOD FOR CORRECTING IMAGE DATA

(57)Abstract:
PROBLEM TO BE SOLVED: To reduce the flickers of displayed images when correcting the brightness components of image data, and also to reduce the size of an image data correcting apparatus.
SOLUTION: The image data correcting apparatus comprises an average brightness calculating section 7 for calculating the average brightness of the image data and then outputting the average brightness level, latches 8-10 for delaying the received average brightness level by one frame and then outputting the delayed average brightness level, LUT 2 which outputs the preliminarily set maximum correction coefficient (e) when it receives the image data, correction coefficient calculating sections 3-6, adders 11 and 13, and a multiplication device 12. Each correction coefficient calculating section compares the received average brightness level with a plurality of correction threshold values, and based on the comparison result, weights the maximum correction coefficient (e), and outputs the weighted maximum correction coefficient as a correction coefficient. Based on the average value of these correction coefficients, the adders 11 and 13 and the multiplication device 12 correct the brightness level of the image data.



LEGAL STATUS

[Date of request for examination] 19.09.2001

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

CLAIMS

[Claim(s)]
[Claim 1] Image data correction equipment characterized by providing the following. The average luminance calculation section which computes average luminance of said image data inputted whenever it inputted image data of one frame, and is outputted as an average intensity level The delay section which delays an average intensity level outputted from said average luminance calculation section by one frame The table section which outputs the maximum correction factor value beforehand set up if said image data is inputted The 1st correction factor calculation section which compares with said average intensity level from said average luminance calculation section two or more amendment thresholds with which values set up beforehand differ, performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 1st correction factor value, The 2nd correction factor calculation section which compares said two or more amendment thresholds and average intensity level from said delay section, performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 2nd correction factor value, The amendment section which amends an intensity level of said image data based on average value computed while computing average value of the 1st and 2nd correction factor values
[Claim 2] Said delay section is constituted from two or more delay circuits which delay an average intensity level outputted from said average luminance calculation section every one frame one by one in claim 1. Said 2nd correction factor calculation section is prepared corresponding to two or more delay circuits, and two or more average intensity level and said two or more amendment thresholds from a delay circuit are compared, respectively. Image data correction equipment characterized by constituting from two or more correction factor calculation sections which perform weighting of said maximum correction factor value according to a comparison result, respectively, and are outputted as a correction factor value.
[Claim 3] If two or more amendment thresholds are inputted, while computing the average of each amendment threshold which chose and chose two amendment thresholds in two or more inputted amendment thresholds in claim 1 The threshold amendment section outputted with said two or more amendment thresholds which inputted the computed average is prepared. Said 1st correction factor calculation section Two or more amendment thresholds from said threshold amendment section and average value are compared with an average intensity level from said average luminance calculation section. According to a comparison result, weighting of said maximum correction factor value is performed, and it outputs as 1st correction factor value. Said 2nd correction factor calculation section Image data correction equipment characterized by comparing two or more amendment thresholds from said threshold amendment section, and average value with an average intensity level from said delay section, performing weighting of said maximum correction factor value according to a comparison result, and outputting as 2nd correction factor value.
[Claim 4] A said average luminance calculation section's brightness component value of image data for one frame accumulation accumulation-adder based on a pixel clock and a Vertical Synchronizing signal of said image data in claim 1, Image data correction equipment characterized by consisting of multipliers which compute average value of a brightness component of image data by multiplying this accumulation aggregate value by the inverse number of the number of pixels in image data in one frame, and are outputted as said average intensity level if an accumulation aggregate value from said accumulation adder is inputted.
[Claim 5] In claim 1 said 1st and 2nd correction factor calculation sections Two or more comparators which compare size of an inputted average intensity level and two or more amendment thresholds, respectively, and judge height of said average intensity level, A decoder which outputs a multiplication coefficient of a value according to height of said average intensity level judged by said comparator, Image data correction equipment which carries out the multiplication of the maximum correction factor value from said table section, and the multiplication coefficient from said decoder to which a value becomes large as said average intensity level becomes low, and is characterized by consisting of multipliers which output this multiplication result as a correction factor.

[Claim 6] It is image data correction equipment characterized by consisting of a multiplier which computes average value of the 1st and 2nd correction factor values from an aggregate value added with the 1st adder with which said amendment section adds the 1st and 2nd correction factor values in claim 1, and said 1st adder, and the 2nd adder which adds average value from said multiplier to said image data.
[Claim 7] An image data correction method characterized by providing the following. The 1st step which computes average luminance of said image data inputted whenever it inputted image data of one frame, and is outputted as an average intensity level The 2nd step which delays an average intensity level computed based on said processing of the 1st of a step by one frame The 3rd step which outputs the maximum correction factor value beforehand set up if said image data is inputted Two or more amendment thresholds from which a value set up beforehand differs are compared with an average intensity level computed based on said processing of the 1st step. The 4th step which performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 1st correction factor value, The 5th step which compares said two or more amendment thresholds with an average intensity level based on said processing of the 2nd step, performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 2nd correction factor value, The 6th step which amends an intensity level of said image data based on average value computed while computing average value of the 1st and 2nd correction factor values
[Claim 8] In claim 7, processing in said 2nd step Processing in said 5th step including the 7th step which delays an average intensity level computed based on processing of the 1st of a step every one frame one by one An image data correction method characterized by including the 8th step which compares said two or more amendment thresholds with each average intensity level delayed based on processing of the 7th step, respectively, performs weighting of said maximum correction factor value according to a comparison result, respectively, and is outputted as a correction factor value.
[Claim 9] If two or more amendment thresholds are inputted, while computing the average of each amendment threshold which chose and chose two amendment thresholds in two or more inputted amendment thresholds in claim 7 Have the 9th step outputted with said two or more amendment thresholds which inputted the computed average, and processing in said 4th step Two or more amendment thresholds and average value based on said processing of the 9th of a step are compared with an average intensity level computed based on said processing of the 1st step. Processing in said 5th step including the 10th step which performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 1st correction factor value Two or more amendment thresholds and average value based on said processing of the 9th of a step are compared with an average intensity level based on said processing of the 2nd step. An image data correction method characterized by including the 11th step which performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 2nd correction factor value.
[Claim 10] In claim 7, processing in said 1st step The 12th accumulation step [value / of image data for one frame / brightness component] based on a pixel clock and a Vertical Synchronizing signal of said image data, If an accumulation aggregate value based on said processing of the 12th of a step is inputted An image data correction method characterized by including the 13th step which computes average value of a brightness component of image data by multiplying this accumulation aggregate value by the inverse number of the number of pixels in image data in one frame, and is outputted as said average intensity level.
[Claim 11] In claim 7, processing in said 4th and 5th steps The 14th step which compares size of an inputted average intensity level and two or more amendment thresholds, respectively, and judges height of said average intensity level, The 15th step which outputs a multiplication coefficient of a value according to height of said average intensity level judged based on said processing of the 14th of a step, An image data correction method which carries out the multiplication of said maximum correction factor value and the multiplication coefficient based on said processing of the 15th of a step in which a value becomes large as said average intensity level becomes low, and is characterized by including the 16th step which outputs this multiplication result as a correction factor.
[Claim 12] Claim 7 characterized by providing the following Processing in said 6th step is the 17th step adding the 1st and 2nd correction factor values. The 18th step which computes the average of the 1st and 2nd correction factor values from an aggregate value based on said processing of the 17th of a step The 19th step which adds the average based on processing of said step of 18 to said image data

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the image data correction equipment and the image data correction method of amending to the brightness component of the inputted image data.
[0002]
[Description of the Prior Art] As compared with the monitor with which the monitor (display) used for computer apparatus is used for television, the image displayed since the distance between a user and a monitor is short has a property dark (brightness is low) on the whole. For this reason, in displaying the image contents generated for television with a computer apparatus, in order to raise the visibility of a dark portion to the brightness component of image data, the amendment processing to a brightness component is called for.
[0003] For example, when performing amendment processing of a brightness component, two or more LUTs (Look Up Table: look-up table) are used, LUT according to the frequency of occurrence of the dark space in [that inside to] image data is chosen, and the technology which amends a brightness component based on this selected LUT is indicated by the application for patent No. 228730 [2000 to].
[0004] Drawing 8 is the block diagram showing an example of such image data correction equipment. Image data correction equipment 100 consists of the dark space frequency counter 101, the LUT selection section 102, and an LUT converter 103. The dark space frequency counter 101 counts the frequency of occurrence of the dark space of under a regular intensity level about image data. The LUT selection section 102 chooses LUT used for the brightness component amendment to image data based on the frequency of occurrence of the dark space computed by the dark space frequency counter 101. The LUT converter 103 has two or more LUT#1 - #n inside, and is amending the brightness component to image data using LUT chosen by the LUT selection section 102.
[0005]
[Problem(s) to be Solved by the Invention] However, since conventional image data correction equipment had two or more LUTs in order to amend a brightness component, it had the technical problem that equipment became large-scale. Moreover, since conventional image data correction equipment was amending the brightness component of image data based on the frequency of occurrence of the dark space in one frame, when the frequency of occurrence of the dark space in image data fluctuated frequently near the set-up amendment threshold (amendment threshold), the technical problem that a flicker occurred was also shown in graphic display.
[0006] Therefore, this invention aims at attaining the miniaturization of equipment while it reduces a flicker of graphic display, when amending the brightness component of image data.
[0007]
[Means for Solving the Problem] The average luminance calculation section which computes average luminance of image data inputted whenever this invention inputted image data of one frame, in order to solve such a technical problem, and is outputted as an average intensity level, The delay section which delays an average intensity level outputted from the average luminance calculation section by one frame, The table section which will output the maximum correction factor value set up beforehand if image data is inputted (LUT2), The 1st correction factor calculation section which compares two or more amendment thresholds and an average intensity level from the average luminance calculation section from which a value set up beforehand differs, performs weighting of said maximum correction factor value according to a comparison result, and is outputted as 1st correction factor value (3), The 2nd correction factor calculation section which compares two or more amendment thresholds with an average intensity level from the delay section, performs weighting of the maximum correction factor value according to a comparison result, and is outputted as 2nd correction factor value, The amendment section which amends an intensity level of said image

data based on average value computed while computing average value of the 1st and 2nd correction factor values is prepared.

[0008] Moreover, two or more delay circuits (latches 8-10) which delay an average intensity level outputted from said average luminance calculation section every one frame one by one as the delay section are prepared. The 2nd correction factor calculation section is prepared corresponding to two or more delay circuits, and an average intensity level from two or more delay circuits is compared with two or more amendment thresholds, respectively. It constitutes from two or more correction factor calculation sections (4-6) which perform weighting of said maximum correction factor value according to a comparison result, and are outputted as a correction factor value, respectively. Moreover, if two or more amendment thresholds are inputted, while computing the average of each amendment threshold which chose and chose two amendment thresholds in two or more inputted amendment thresholds The threshold amendment section which outputs two or more amendment thresholds inputted as the computed average is prepared. The 1st correction factor calculation section Two or more amendment thresholds from the threshold amendment section and average value are compared with an average intensity level from the average luminance calculation section. Weighting of the maximum correction factor value is performed according to a comparison result, and it outputs as 1st correction factor value. The 2nd correction factor calculation section Two or more amendment thresholds from the threshold amendment section and average value are compared with an average intensity level from the delay section, weighting of the maximum correction factor value is performed according to a comparison result, and it outputs as 2nd correction factor value.

[0009] Moreover, a brightness component value of image data for one frame accumulation accumulation [the average luminance calculation section]-adder based on a pixel clock and a Vertical Synchronizing signal of image data (71), If an accumulation aggregate value from an accumulation adder is inputted, it constitutes from a multiplier (72) which computes average value of a brightness component of image data by multiplying this accumulation aggregate value by the inverse number of the number of pixels in image data in one frame, and is outputted as an average intensity level. Moreover, two or more comparators which compare size of an average intensity level which inputted the 1st and 2nd correction factor calculation sections, respectively, and two or more amendment thresholds, respectively, and judge height of an average intensity level (31-34), A decoder which outputs a multiplication coefficient of a value according to height of an average intensity level judged by comparator (35), The multiplication of the maximum correction factor value from the table section and the multiplication coefficient from said decoder to which a value becomes large as an average intensity level becomes low is carried out, and it constitutes from a multiplier (36) which outputs this multiplication result as a correction factor. Moreover, it constitutes from a multiplier (12) which computes average value of the 1st and 2nd correction factor values from an aggregate value which added the amendment section with the 1st adder (11) adding the 1st and 2nd correction factor values, and the 1st adder, and the 2nd adder (13) which adds average value from a multiplier to image data.

[0010]

[Embodiment of the Invention] Hereafter, this invention is explained with reference to a drawing.

(Gestalt of the 1st operation) Drawing 1 is the block diagram of the image data correction equipment in which the gestalt of operation of the 1st of this invention is shown. This image data correction equipment 1 consists of LUT (look-up table: Look Up Table)2, the correction factor calculation sections 3-6, the average luminance calculation section 7, latches 8-10, adders 11 and 13, and a multiplier 12, as shown in drawing 1 .

[0011] Here, an image data value is treated as the address at the time of read-out of the input image data IN, and LUT2 outputs the maximum correction factor value e set up beforehand, whenever the image data IN is inputted. Moreover, the average luminance calculation section 7 inputs the synchronizing signal E of the image data IN, and the image data IN, computes the average value of the brightness component of the image data in one frame for every Vertical Synchronizing signal, and generates the average intensity-level data a. Moreover, latch 8, latch 9, and latch 10 receive the synchronizing signal (Vertical Synchronizing signal) E of the image data IN, respectively, and delay the average intensity-level data a computed by the average luminance calculation section 7 to every Vertical Synchronizing signal E, and the average intensity-level data b, the average intensity-level data c, and the average intensity-level data d are generated, respectively.

[0012] Furthermore, the correction factor calculation section 3 performs weighting according to the result of said comparison to the maximum correction factor value e inputted from LUT2, and outputs a correction factor f while it compares the average intensity-level data a, the amendment threshold (amendment threshold) A, the amendment threshold B, the amendment threshold C, and the amendment threshold D. Moreover, the correction factor calculation section 4 performs weighting according to the result of said comparison to the maximum correction factor value e both inputted as if the average intensity-level data b, the amendment threshold A, the amendment threshold B, the amendment threshold C, and the amendment threshold D are compared from LUT2 like the correction factor calculation

section 3, and outputs it as a correction factor g. Moreover, the correction factor calculation section 5 performs weighting according to the result of said comparison to the maximum correction factor value e both inputted as if the average intensity-level data c, the amendment threshold A, the amendment threshold B, the amendment threshold C, and the amendment threshold D are compared from LUT2 like the correction factor calculation section 3, and outputs it as a correction factor h. Furthermore, the correction factor calculation section 6 performs weighting according to the result of said comparison to the maximum correction factor value e both inputted as if the average intensity-level data d, the amendment threshold A, the amendment threshold B, the amendment threshold C, and the amendment threshold D are compared from LUT2 like the correction factor calculation section 3, and outputs it as a correction factor i.
[0013] Moreover, an adder 11 performs addition of the correction factor f outputted from each correction factor calculation sections 3, 4, 5, and 6, respectively, a correction factor g, a correction factor h, and a correction factor i, and outputs an aggregate value to a multiplier 12. A multiplier 12 carries out the multiplication of the value beforehand set up to the aggregate value inputted from the adder 11, makes it a real correction factor value, and is outputted to an adder 13. An adder 13 adds the real correction factor value from a multiplier 12 to the input image data IN, and outputs it as image data OUT with which amendment was applied to the brightness component.
[0014] This image data correction equipment 1 thus, average intensity-level a of the input image data IN computed by the average luminance calculation section 7 It is delayed by multiple frame time amount by latch 8, latch 9, and latch 10. Correction factor f-i is computed based on each delayed value, the average value (said real correction factor value) of correction factor f-i for a multiple frame amends the input image data IN, and the brightness component of the image data IN is amended. Thereby, when the average intensity level of the image data IN fluctuates near the amendment threshold, the correction value of a brightness component cannot follow it rapidly, therefore a flicker on the graphic display based on rapid fluctuation of brightness component correction value can be reduced.
[0015] Next, the detailed configuration of said average luminance calculation section 7 in image data correction equipment 1 is explained with reference to drawing 2 . The average luminance calculation section 7 can consist of an accumulation adder 71, a multiplier 72, and latch's 73 combination, as shown in drawing 2 . The accumulation adder 71 accumulation-outputs this aggregate value for the brightness component value of the image data IN to a multiplier 72 based on the pixel clock and Vertical Synchronizing signal E of the input image data IN. Here, an accumulation aggregate value is reset by Vertical Synchronizing signal E of the image data IN.
[0016] A multiplier 72 carries out the multiplication of the value beforehand set up to the accumulation aggregate value from the accumulation adder 71. Here, the multiplication result outputted from a multiplier 72 by making into the inverse number of the number of pixels in the image data for example, in one frame said multiplication value set up beforehand serves as the average of the brightness component in the image data IN in one frame. Latch 73 latches 1 frame time of output values from the multiplier 72 in front of reset of the accumulation aggregate value of the accumulation adder 71 based on the synchronizing signal E of the image data IN. Thereby, the average luminance calculation section 7 can output average intensity-level a of the image data updated by every Vertical Synchronizing signal E from the synchronizing signal E of image data, and the image data IN.
[0017] Next, the detailed configuration of each correction factor calculation sections 3-6 in image data correction equipment 1 is explained. These correction factor calculation sections 3-6 are realizable in the combination of a comparator, a decoder, and a multiplier. Drawing 3 is the block diagram showing the configuration of the correction factor calculation section 3 among the correction factor calculation sections 3-6. Other correction factor calculation sections 4-6 are the same configurations as the correction factor calculation section 3. The correction factor calculation section 3 consists of comparators 31-34, a decoder 35, and a multiplier 36, as shown in drawing 3 .
[0018] A comparator 31, a comparator 32, a comparator 33, and a comparator 34 compare the amendment threshold A, the amendment threshold B, the amendment threshold C, and the amendment threshold D with the average intensity-level data a, respectively, and output a comparison result to a decoder 35. A decoder 35 receives each comparison result from a comparator 31, a comparator 32, a comparator 33, and a comparator 34, and outputs the multiplication coefficient according to each comparison result to a multiplier 36. That is, a decoder 35 outputs the multiplication coefficient of such a large value that an average intensity level is low while outputting the multiplication coefficient of such a small value that an average intensity level is high. A multiplier 36 carries out the multiplication of the maximum correction factor e and the multiplication coefficient from a decoder 35 which were inputted from LUT2, and outputs them as a correction factor f. Thereby, a correction factor f serves as such a small value, and serves as such a large value that an average intensity level is low that the average intensity level of the input image data IN is high.
[0019] Here, when size relation of the amendment threshold inputted into a comparator 31, a comparator 32, a comparator 33, and a comparator 34 is set to amendment threshold A> amendment threshold B> amendment threshold C> amendment threshold D, respectively, the multiplication coefficient outputted from a decoder 35 is set up as follows,

for example. namely, -- multiplication coefficient <- -- 0/4 when (average intensity-level data > amendment threshold A)
else 1/4 when (average intensity-level data > amendment threshold B)
else 2/4 when (average intensity-level data > amendment threshold C)
else 3/4 when (average intensity-level data > amendment threshold D)
else The value whose correction factor f which can come 4/4, is alike and is outputted more from the correction factor calculation section 3 was injured with weight by fluctuation of average intensity-level data is outputted.

[0020] Next, the important section of the image data correction equipment 1 constituted as mentioned above is further explained to details with reference to drawing 1 , drawing 4 , and drawing 5 . Usually, as for image data, an average intensity level is changed by each scene in image contents. For example, if the whole screen is a dark scene, an average intensity level is low, and conversely, if the whole screen is a bright scene, an average intensity level is high. With the gestalt of this operation, when [dark in the whole screen] an average intensity level is low, correction value is added to image data and it amends to the brightness component of image data, and when [that the whole screen is bright] an average intensity level is high, it is made not to amend.

[0021] Drawing 4 (a) is a graph which shows the example of the intensity level of the image data output after the amendment to the intensity level of the input image data in the case of being recognized as the average intensity level of image data being the darkest. Here, the value of the level shown on a horizontal axis and an axis of ordinate in each graph of drawing 4 and below-mentioned drawing 5 shows the digital value of 0-255 at the time of changing an analog signal into a 8-bit digital signal, and expresses that level is so high that digital value is large. In the graph shown in drawing 4 (a), the amendment degree to the dark space of the image data IN is enlarged. That is, in less than [with the low intensity level of the image data IN / value X1], he makes a correction factor value into size, for example, is trying to amend and output to the video signal of a high intensity level like a value Y1.

[0022] Drawing 4 (b) is a graph which shows the example of the set point over LUT2 in the case of realizing an amendment property like drawing 4 (a). In case it amends to the image data IN, only the aggregate value over the image data IN is set to LUT2 as the maximum correction factor e in the first half. Here, if the image data IN which has the intensity level of a value X1 is inputted into LUT2, LUT2 will output the set point Y2 set as the address which is equivalent to the value X1 as mentioned above as correction value. As a result of adding this correction value Y2 to the input image data IN, the output image data of the intensity level Y1 shown in drawing 4 (a) is obtained.

[0023] By the way, as the image data IN inputted into this equipment 1 was mentioned above, average intensity-level a in one frame is computed by the average luminance calculation section 7. Computed average intensity-level a is latched for every one-frame period based on Vertical Synchronizing signal E of image data as latch 8, latch 9, and latch 10 be alike, respectively, and average intensity-level b, average intensity-level c, and average intensity-level d are obtained.

[0024] Drawing 5 is a graph which shows the relation between the intensity level of the image data IN in each correction factor calculation sections 3-6, and the correction factor computed corresponding to this intensity level. With the gestalt of this operation here the size relation between the amendment threshold A, the amendment threshold B, the amendment threshold C, and the amendment threshold D The correction factor which is setting to amendment threshold A> amendment threshold B> amendment threshold C> amendment threshold D, and was computed by each correction factor calculation sections 3-6 As shown in drawing 5 , the case where the average intensity level of the input image data IN is higher than the amendment threshold A is the smallest, and the case where the average intensity level of the input image data IN is lower than the amendment threshold D becomes the largest. That is, said correction factor serves as such a small value, and serves as such a large value that an average intensity level is low that the average intensity level of the input image data IN is high.

[0025] Therefore, the correction factor f according to the average intensity level of four frames which continues "The correction factor calculation section 3, the correction factor calculation section 4, the correction factor calculation section 5, and the correction factor calculation section 6 be alike, respectively", a correction factor g, a correction factor h, and a correction factor i can be obtained. These correction factor values are altogether added with an adder 11, and if the multiplication of the quadrant of the added multiplication coefficient is carried out by the multiplier 12, the average of the correction factor in four continuous frames can be acquired. In an adder 13, the average value of this correction factor for four frames is added to the input image data IN, and it outputs as image data OUT after amendment.

[0026] Thus, in quest of the average value of the average intensity level in two or more frames, it writes as the brightness correction factor to image data, and when the average intensity level of image data fluctuates near [which was set up] the amendment threshold frequently, the stable graphic display with few flicker can be obtained. Moreover, since it constituted so that the value stored in LUT2 might be made only into amendment maximum (the maximum correction factor e) and brightness component correction value might be computed from this amendment maximum by

change of the average intensity level of image data, and it is not necessary to have LUT for every central value of an average intensity level, therefore two or more LUTs become unnecessary, equipment can be constituted on a small scale.
[0027] (Gestalt of the 2nd operation) Drawing 6 is the block diagram of the image data correction equipment in which the gestalt of operation of the 2nd of this invention is shown, and forms the threshold amendment section 14 in the image data correction equipment of the gestalt of the 1st operation shown in drawing 1 . As shown in drawing 6 , the threshold amendment section 14 changes by inputting four amendment threshold A-D, and outputs the amendment threshold of seven pieces to the correction factor calculation sections 3-6, respectively.
[0028] Drawing 7 is the block diagram showing the detailed configuration of the threshold amendment section 14. The threshold amendment section 14 consists of an adder 41, a multiplier 42, the adder 43, a multiplier 44, an adder 45, and a multiplier 46, as shown in drawing 7 . In the threshold amendment section 14, with an adder 41 and a multiplier 42, the average of the amendment threshold A and the amendment threshold B is computed, and the amendment threshold F used as the amendment threshold A and the mean value of the amendment threshold B is outputted. Moreover, with an adder 43 and a multiplier 44, the average of the amendment threshold B and the amendment threshold C is computed, and the amendment threshold G used as the amendment threshold B and the mean value of the amendment threshold C is outputted. Furthermore, with an adder 45 and a multiplier 46, the average of the amendment threshold C and the amendment threshold D is computed, and the amendment threshold H used as the amendment threshold C and the mean value of the amendment threshold D is outputted. In addition, the threshold amendment section 14 outputs each inputted amendment thresholds A, B, C, and D as they are.
[0029] Although the fluctuation of the correction factor which will be supplied to an adder 13 by the adder 11 and the multiplier 12 even if it computes the average of a correction factor if the maximum correction factor e is greatly set up to LUT2 with the gestalt of the 1st operation shown in drawing 1 may become large With the gestalt of the 2nd operation, fluctuation of the correction factor given to an adder 13 can be suppressed by making small the difference between the amendment thresholds which adjoin by the threshold amendment section 14. Therefore, compared with the gestalt of the 1st operation, rapid fluctuation of brightness component correction value can be controlled further, and the stable graphic display with more few flicker can be obtained.
[0030] the -- it constituted so that you might make it further delayed by three frames by latch 10 while delaying average intensity-level [which was computed by the average luminance calculation section 7 in the gestalt of the operation which reaches one] a by one frame by latch 8, and making it output as average intensity-level b, and making it delayed by two frames by latch 9 and making it output as average intensity-level c, and it might be made to output as average intensity-level d. namely, when the average luminance calculation section 7 computes average luminance by inputting the new image data IN and outputs to the correction factor calculation section 3 Latch 8 outputs the average intensity level of the image data one frame before the image data IN to the correction factor calculation section 4. The latch 9 constituted the latch 10 so that the average intensity level of the image data three frames before the image data IN might be outputted to the correction factor calculation section 6, while outputting the average intensity level of the image data two frames before the image data IN to the correction factor calculation section 5.
[0031] In such a case, only the average luminance calculation section 7 and latch 8 are formed. When the average luminance calculation section 7 computes average luminance by inputting the new image data IN and outputs to the correction factor calculation section 3, latch 8 makes the average intensity level of the image data one frame before the image data IN output to the correction factor calculation section 4. Each correction factor calculation sections 3 and 4 compute a correction factor based on the inputted average intensity level, and output it to an adder 11 as correction factors f and g. While an adder 11 adds these, even if it constitutes so that the average value of each correction factors f and g may be computed, an adder 13 may add said average value to the image data IN and a multiplier 12 may output as image data OUT, the stable graphic display with few flicker can be obtained. By taking such a configuration, latches 9 and 10 and the correction factor calculation sections 5 and 6 are omissible.
[0032]
[Effect of the Invention] The average luminance calculation section which computes the average luminance of the image data inputted whenever it inputted image data of one frame according to this invention, as explained above, and is outputted as an average intensity level, The delay section which delays the average intensity level outputted from the average luminance calculation section by one frame, The table section which will output the maximum correction factor value set up beforehand if image data is inputted, While preparing the 1st and 2nd correction factor calculation sections, and the 1st correction factor calculation section's comparing two or more amendment thresholds and the average intensity level from the average luminance calculation section which were set up beforehand and from which a value differs, respectively, performing weighting of the maximum correction factor value according to a comparison result

and outputting as 1st correction factor value The 2nd correction factor calculation section compares two or more amendment thresholds with the average intensity level from the delay section. Since the intensity level of said image data was amended based on the average value which performed weighting of the maximum correction factor value according to the comparison result, outputted as 2nd correction factor value, and computed and computed the average value of the 1st [which was outputted] and 2nd correction factor values When the average intensity level of image data fluctuates near the amendment threshold frequently, while being able to obtain little stable graphic display with rice cake Equipment can be constituted on a small scale that what is necessary is to prepare in equipment only the table which is one to which the maximum correction factor value was set therefore.

[Translation done.]

* NOTICES *

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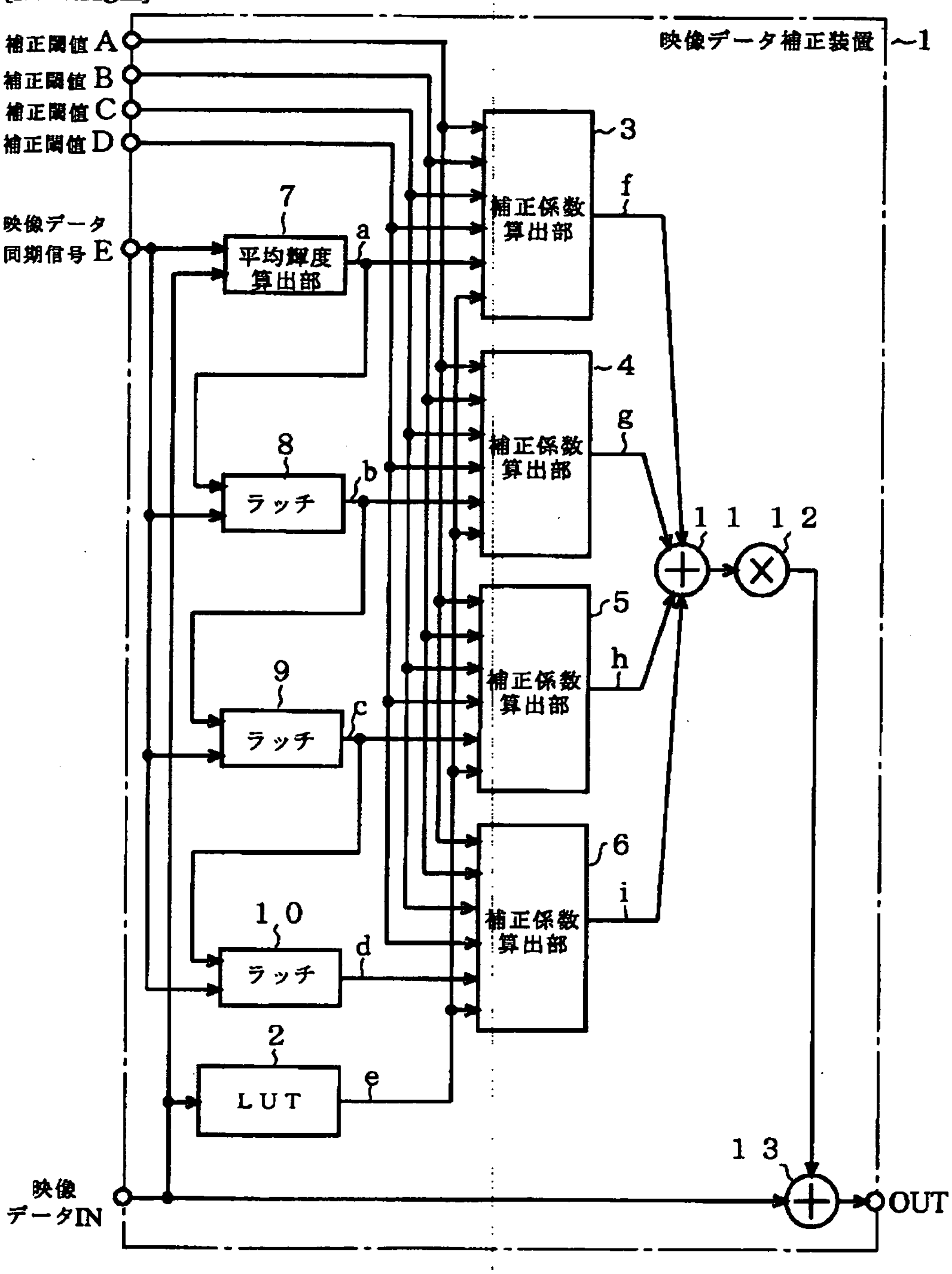
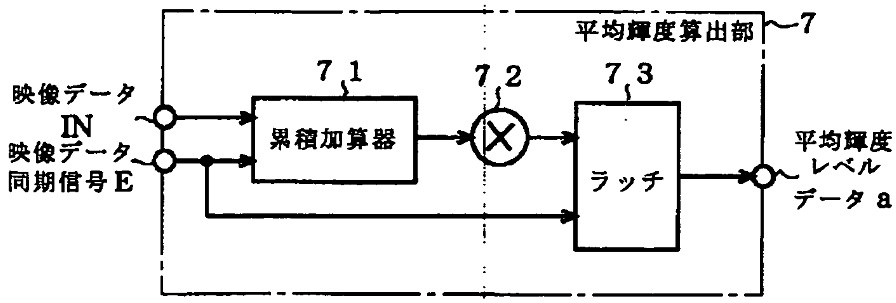
3.In the drawings, any words are not translated.

DRAWINGS

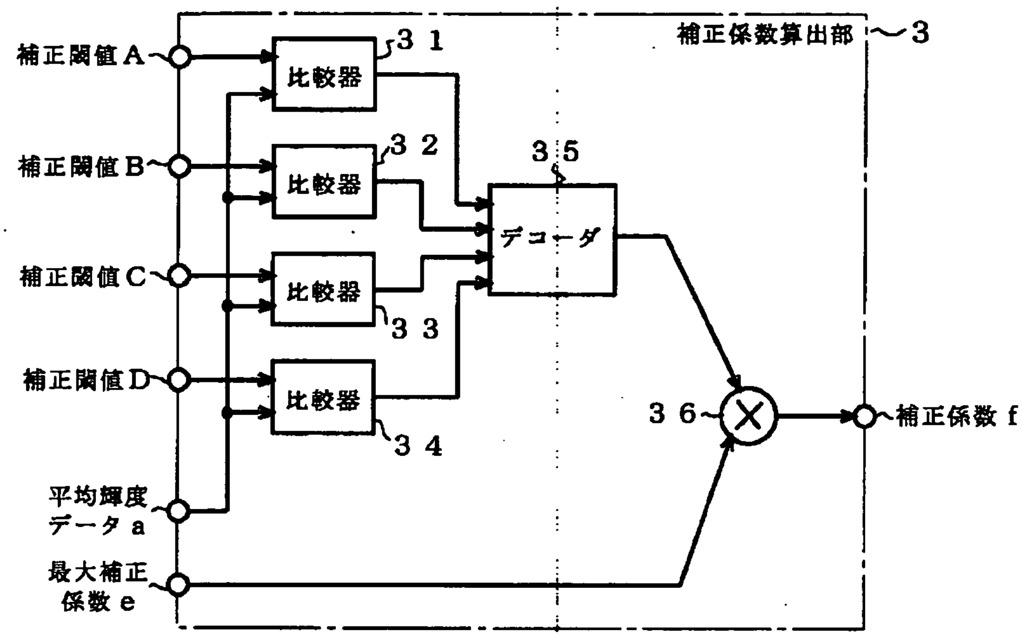
[Drawing 1]



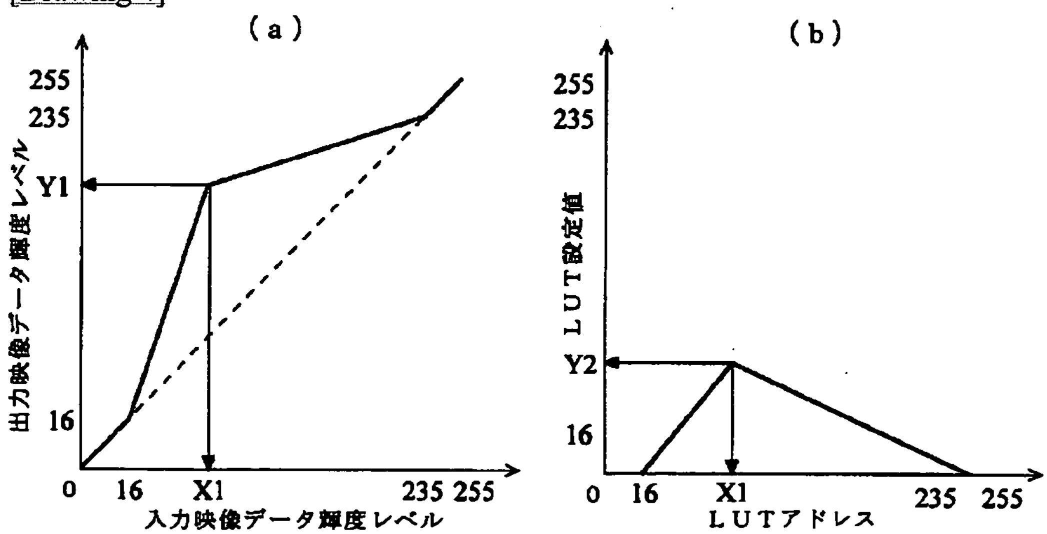
[Drawing 2]



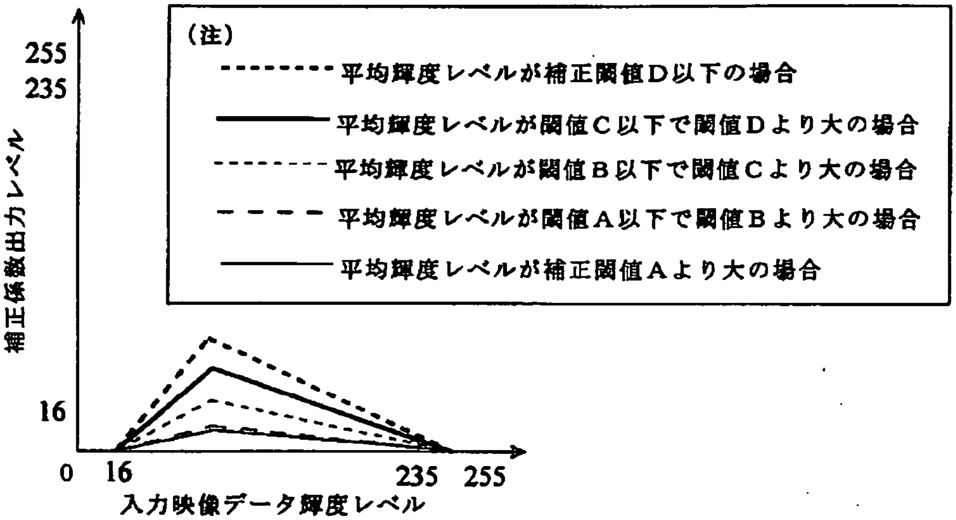
[Drawing 3]



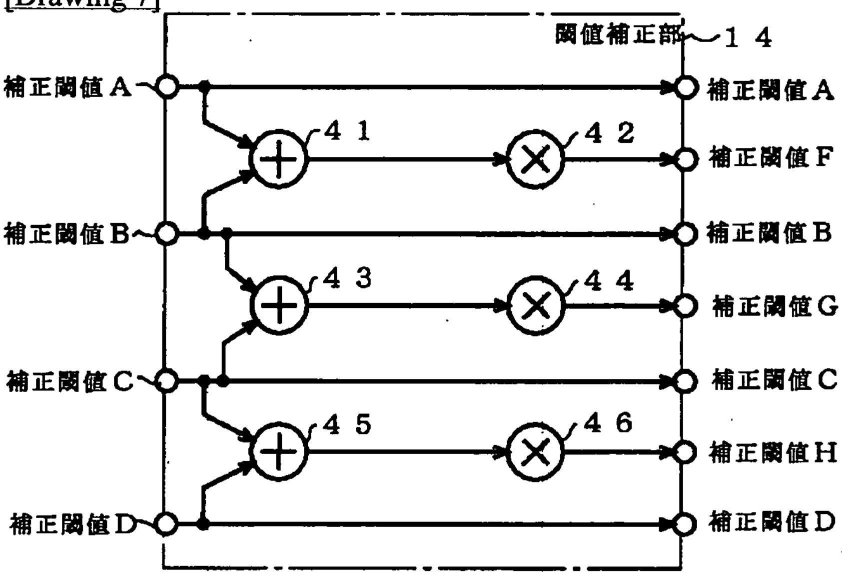
[Drawing 4]



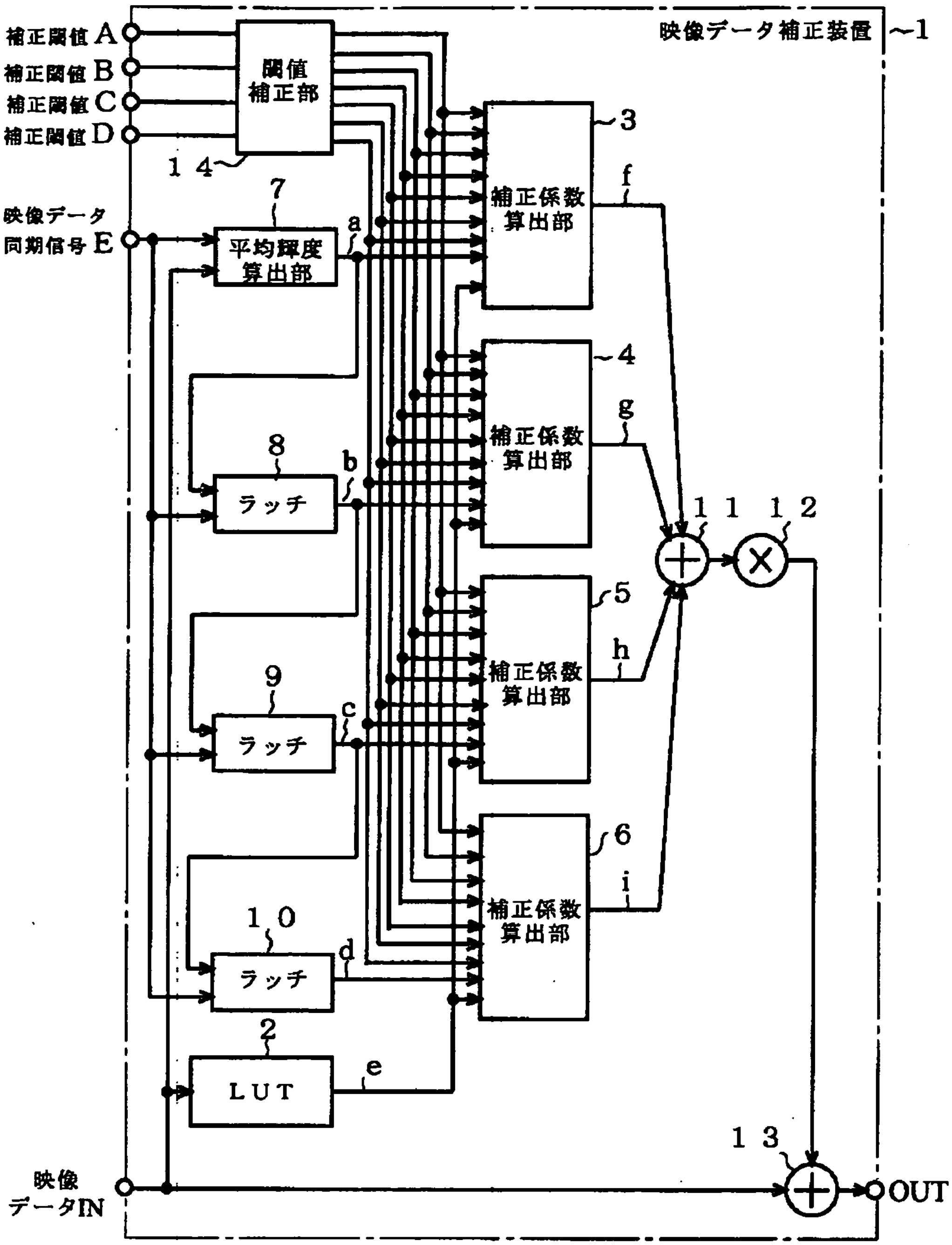
[Drawing 5]



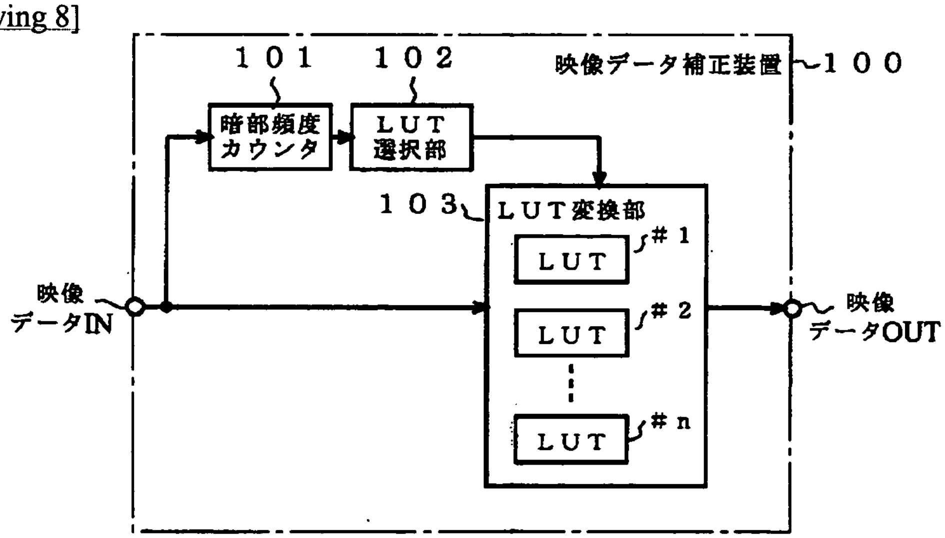
[Drawing 7]



[Drawing 6]


映像データ補正装置
1
補正閾値A
補正閾値B
補正閾値C
補正閾値D
閾値補正部
14
映像データ同期信号E
7
平均輝度算出部
a
8
ラッチ
b
9
ラッチ
c
10
ラッチ
d
2
LUT
e
3
補正係数算出部
f
4
補正係数算出部
g
5
補正係数算出部
h
6
補正係数算出部
i
11
12
13
映像データIN
OUT

[Drawing 8]


映像データ補正装置
100
101
102
暗部頻度カウンタ
LUT選択部
103
LUT変換部
LUT
#1
LUT
#2
LUT
#n
映像データIN
映像データOUT

[Translation done.]